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(54) Abstract Title
Collapsible vehicle seat

(57) A seat arrangement (1) is provided which comprises a base member (2) and a back member (3) respectively pivotable about a base hinge (6) and a seat hinge (5). In a seat deployed configuration, the arrangement (1) having the back member (3) substantially perpendicular to the base member (2) whilst the combination of the members (2, 3) is rotatable about the base hinge (6) in order to ensure at least a part of a recess (7) within a vehicle has a robust bridge surface (13) thereacross which can form a suitable floor surface for luggage storage. Typically, the base member (2) and back member (3) will be substantially aligned within the recess upon assuming a stowed configuration in order to provide a relatively planar and flat floor surface comprising resilient panel surfaces (13, 14) of the members (2, 3) along with the vehicle floor surface (8) about the recess (7). Valence members (12) may extend across any gaps between the members (2, 3) or between the recess (7) and either of the members (2, 3).

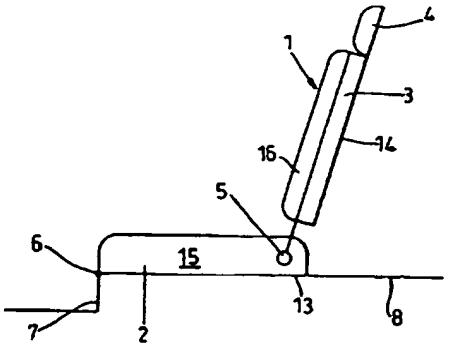


Fig. 1

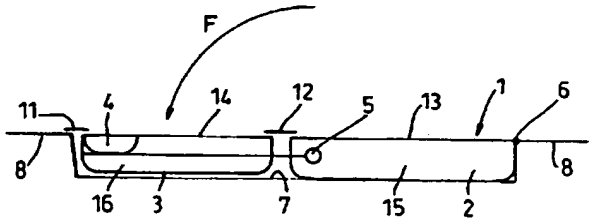


Fig. 5

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

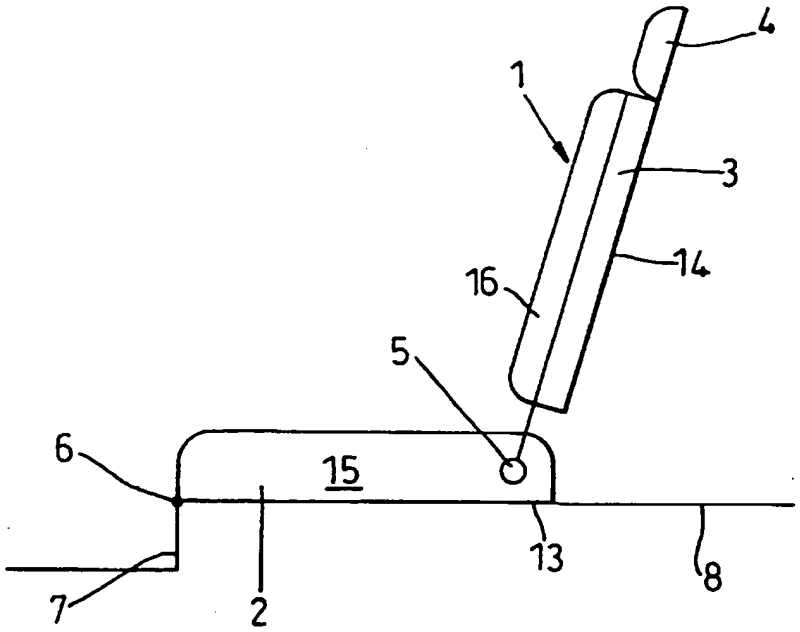


Fig. 1

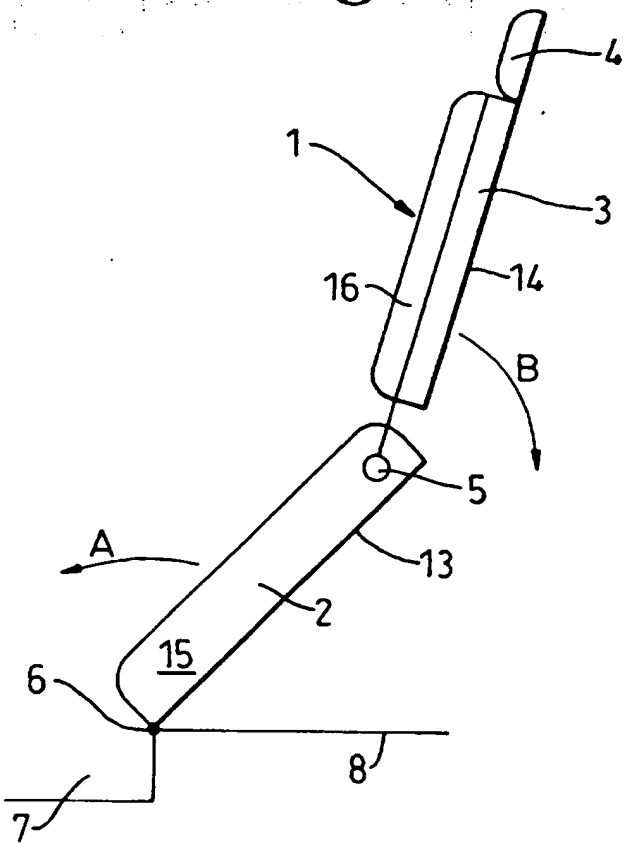


Fig. 2

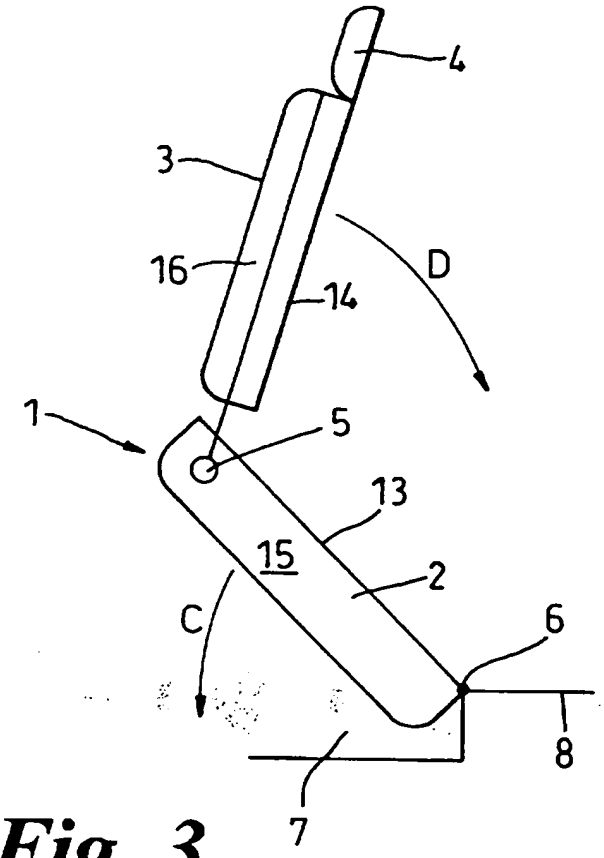


Fig. 3

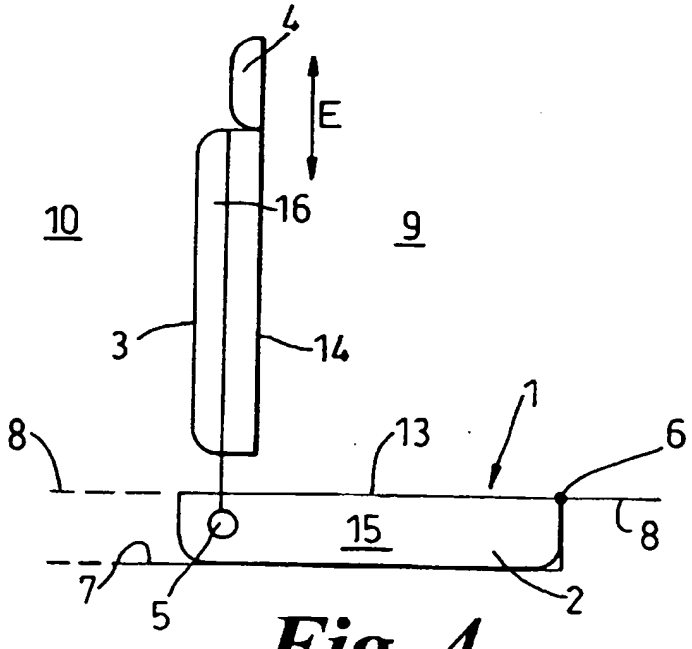


Fig. 4

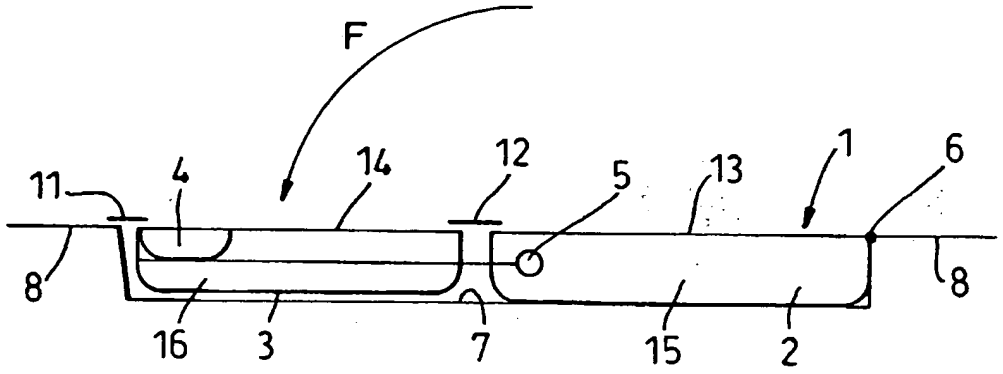


Fig. 5

A SEAT ARRANGEMENT

The present invention relates to a seat arrangement and more particularly to a seat arrangement used for so-called auxiliary or third row seating within a utility vehicle.

Within a motor vehicle, the number of seats available for occupants must be balanced with that area provided for luggage/stowage. This particular balance is particularly difficult with regard to so-called utility vehicles where the number of passengers to be carried by the vehicle can vary greatly. In such circumstances, it is convenient to provide auxiliary or so-called third row seating within that type of motor vehicle which can be relatively easily deployed for occupation as and when required.

Unfortunately, it will be appreciated that auxiliary or third row seating can be intrusive within the vehicle even when not deployed. Furthermore, third row or auxiliary seating can significantly add to vehicle weight. There are known systems for deploying auxiliary seating from a roof, side and floor of the vehicle interior. However, generally relatively complex mechanisms have been provided in order to achieve the necessary ease of deployment about and around existing vehicle structural features such as wheel arches, etc. In addition, with regard to floor deployed auxiliary seating, it will be understood that generally an additional panel has been required above the auxiliary seat mechanism in order to ensure an adequately robust surface is provided upon which luggage and other items can be located. This panel may itself cause problems with stowage, etc.

It is an object of the present invention to provide a seat arrangement which substantially achieves the desirable of providing auxiliary seating whilst avoiding the problems outlined above.

In accordance with the present invention there is provided a seat 1 for a vehicle, the seat arrangement comprising a base member and a back member, the base member being hinged by a base hinge along an edge of a recess and to the back member by a seat hinge, the base member and the back member respectively having a resilient panel which can be rotated about the seat hinge to be aligned and so be consistent with at least a part of the recess to form a robust bridge surface thereacross, whilst the base member, and the back member attach thereto, can be rotated about the base hinge until the base member extends oppositely away from the edge of the recess and the back member extends upwardly from the base member to form a seat therebetween.

Typically, the robust bridge surface will be substantially planar.

The base hinge may rotate substantially 180° between forming the robust surface and the seat therebetween the base member and the back member. Furthermore, in order to form the seat therebetween, the base member and the back member will be arranged in a substantially perpendicular, ie. 90° relationship.

Normally, upon an opposed side of each of the base member and the back member the respective resilient panel there will be provided with cushioning means to facilitate occupant comfort when a seat is formed therebetween. This cushioning means may be utilised to support the respective base member and back member relative to the recess in order to ensure the bridge surface is substantially consistent and/or flat relative to the edges of the recess.

There may be provided valence members about the seat arrangement to further facilitate consistency between the recess and the back member and the seat member whereby the valence members extend across any gaps therebetween.

These valence members may be arranged around the recess edges and/or the edges of the respective resilient panels of the base member and back member.

Typically, the back member will include a headrest retractable into the back member, or detachable, when this back member and the base member are rotated about the base hinge into the recess.

An embodiment of the present invention will now be described by way of example only with reference to the accompanying drawings, in which:

Figure 1 is a pictorial side elevation of a seat arrangement in a deployed seat configuration;

Figure 2 is a pictorial side elevation of the seat arrangement depicted in Figure 1 at a first stage of stowage;

Figure 3 is a pictorial side elevation of the seat arrangement depicted in Figures 1 and 2 at a second stage of stowage;

Figure 4 is a pictorial side elevation of the seat arrangement depicted in Figures 1 to 3 at a third stage of stowage; and,

Figure 5 is a pictorial side elevation of the seat arrangement depicted in Figures 1 to 4 in a final stage of stowage.

The present invention provides a seat which is of an auxiliary nature within a motor vehicle. Thus, the seat will only be deployed when required and inherently will diminish the available area within the vehicle for luggage, stowage, etc. In such circumstances it is necessary to illustrate the present seat arrangement 1 between its fully deployed configuration as a seat within a vehicle depicted in

Figure 1 and its fully stowed configuration within the vehicle depicted in Figure 5. Figures 2 to 4 illustrate various stages of seat arrangement 1 transfer between fully deployment as a seat illustrated in Figure 1 and stowage as depicted in Figure 5.

In Figure 1, it can be seen that a seat arrangement 1 comprises a base member 2 and a back member 3. The back member 3 includes a head rest 4. Thus, the combination of the base member 2 and the back member 3 in their substantially perpendicular relationship as depicted in Figure 1 constitutes a seat for an occupant therebetween.

The base member 2 and the back member 3 are secured together by a seat hinge 5. This seat hinge 5 is generally directly lockable through an appropriate mechanism or may be fixed through latching of the base member 2 and/or the back member 3 to secure the base member 2 relative to the back member 3 in order to constitute a seat therebetween for an occupant. However, when the mechanism for securing the base member 2 relative to the back member 3 to form a seat is released, then relative free movement about the hinge 5 is allowed.

The base member 2 is secured through a base hinge 6 about an edge of a recess 7 within a motor vehicle. Clearly, this recess 7 is typically in the rear luggage floor of that vehicle. The base member 2, and therefore the back member 3 secured through seat hinge 5 also, can rotate about the base hinge 6 towards the recess 7 for stowage as depicted in Figure 5.

In Figure 2 a first stage of seat arrangement 1 stowage is depicted in side elevation. Thus, the base member 2 has been lifted and rotated in the direction of arrow head A towards the recess 7 whilst, the back member 3 is rotated about the seat hinge 5 in the direction of arrow head B. In such circumstances, the

combination of the base member 2 and back member 3 rotate about the base hinge 6 to subtend an arc substantially in the order of 180°.

It will be noted from a consideration of both figures 2 and 3 that the base member 2 and back member 3 comprise a jointed assembly pivotable about the seat hinge 5. Thus, the maximum height of the arc subtended by rotation about the base hinge 6 is that constituted by an in-line addition of the lengths of each member 2, 3. However, it will be understood within a motor vehicle height between a vehicle floor 8 and that vehicle's roof may be limited and so through appropriate cam means an angular presentation of varying relationship may be ensured through the arc of rotation about the base hinge 6 to reduce the necessary height between the floor 8 and the roof 6 necessary to achieve acceptable operation of the present seat arrangement 1. In order to achieve this reduction in necessary height differential between the floor 8 and vehicle roof, it will be noted that the base member 2 and back member 3 between the stages of stowage depicted in Figures 2 and 3 have effectively bowed or undertaken an inversion in the bend between these members 2, 3 about the elbow of seat hinge 5. In such circumstances, at the stage of seat arrangement 1 stowage depicted in Figure 3, the base member 2 rotates downward in the direction of arrow head C whilst the back member 3 may rotate in the direction of arrow head D.

It will be appreciated that the head rest 4 can itself significantly add to the required height between the floor 8 and the vehicle roof in order to allow the seat arrangement 1 to subtend the arc between seat deployment and stowage. Thus, it is generally necessary to either remove the head rest 4 or retract the head rest 4 into the back member 3. This can be prior to initiating stowage but, as illustrated, may be precipitated at a later stage of stowage as illustrated in Figure 4. In Figure 4 the base member 2 has rotated to its fullest extent about the base hinge 6. Thus, a rear side of the base member 2 is consistent with the edge of the recess

7 to which the base pivot 6 is secured in order to provide a consistent bridge surface therewith across a portion of the recess 7.

Figure 4 also illustrates a potential intermediate stage in seat arrangement 1 stowage. In this intermediate stage, it will be appreciated that the back member 3 which has been rotated in the direction of arrow head D (Figure 3) is now held substantially perpendicular to the base member 2 about the seat hinge 5. In such circumstances, the back member 3 essentially divides any floor space 8 within a vehicle from which the present seat arrangement 1 emanates. Thus, the intermediate stage depicted in Figure 4 could provide substantially separated luggage areas within that vehicle divided by the back member 3. For example, a first space 9 directly above the base member 2 could be arranged to accommodate luggage, whilst a second space 10 could be used as accommodation for a pet such as a dog with the back member 3 constituting a guard to prevent that pet wandering into the first luggage space 9 and the remainder of the vehicle. It will also be understood that the headrest 4 could be moved either upward or downward as indicated by arrow heads E. Clearly, a downward movement of the head restraint 4 would retract that head restraint 4 into the back member 3 whilst an upward movement 4 the head restraint 4 towards the vehicle roof would more fully divide the respective spaces 9, 10. It will also be appreciated that the stowage configuration depicted in Figure 4 may be stable and thus the relationship between the base member 2 and the back member 3 about the seat hinge 5 may be locked for appropriate latching or other mechanism.

Figure 5 illustrates the present seat arrangement 1 in a fully stowed configuration. Thus, the back member 3 has been further rotated about the seat hinge 5 in the direction of arrow head F from the state depicted in Figure 4. However, it will also be appreciated that rather than passing through the intermediate stage depicted in Figure 4, the arrangement 1 could move directly

from that configuration depicted in Figure 3 to the stowed configuration depicted in Figure 5 by rotating generally in the opposite direction to arrow head D (Figure 3). In any event, in the stowed configuration, the base member 2 and back member 3 are substantially aligned whereby the recess 7 is substantially filled by these members 2, 3. Furthermore, these members 2, 3 have a substantially planar relationship in order to be consistent with the floor surface 8 about the recess 7. This consistency with the floor surface 8 can be further augmented by inclusion of valence members 11, 12 which extend across any gaps between the edges of the recess 7 and the floor surface 8 and between the rear side surfaces 13, 14 of the members 2, 3 respectively.

The present invention utilises the inherent fact that at least a rear side 13, 14 of each of the members 2, 3 will be a substantially rigid and resilient panel of sufficient strength to have substantially no detrimental effect upon the consistency of the floor 8 within a vehicle. Furthermore, the depth and susceptibility of cushioning layers 15, 16 will be such that the surfaces 13, 14 are sufficiently robustly supported to ensure alignment in consistency with the vehicle floor surface 8 thereabouts. As indicated previously, the combination of base member 2 and back member 3 will substantially fill the recess 7 in the vehicle floor 8. Thus, the present seat arraignment, when stowed, gives a relatively flat floor surface to the vehicle constituted by the floor 8 and the rear side surfaces 13, 14 of the respective members 2, 3. In such circumstances, the seat arrangement 1 does not interfere with the luggage or load carrying capacity of the vehicle. Furthermore, the relatively soft cushion layer 16, 17 are protected from abrasive and other detrimental contact with any luggage loaded in that luggage space. The seat arrangement 1 ensures that the relatively hard seat rear surface 13, 14 is always presented to the load/luggage carrying area of the vehicle.

In order to stabilise and retain the seat arrangement 1 in the seat configuration depicted in Figure 1, the stowed configuration depicted in Figure 5 and, where included, the intermediate stage depicted in Figure 4, an appropriate mechanism will be required to lock the seat arrangement 1 in these configurations. This lock mechanism can be provided through latches secured between the respective members 2, 3 and the floor 8 and sides of the vehicle (not shown). Alternatively, the respective hinges 5, 6 may be lockable in the configurations illustrated in Figures 1, 4, 5. However, it will be appreciated that latching will generally provide a more robust retention of the respective configurations depicted in Figures 1, 4 and 5.

The present seat arrangement 1 could constitute a substantial bench arrangement 1 across the width of a vehicle. Furthermore, this bench across the width of the vehicle could be split in a similar manner to that known with regard to conventional rear (second row) seating within a vehicle. Thus, the vehicle geometries available will include combinations of full bench deployment and split bench deployment as required by vehicle occupant numbers and luggage carrying capacity.

It will be appreciated that as the present invention has a relatively simple operating mechanism, the weight of the seating arrangement 1 is substantially constituted by the respective base member 2 and back member 3. Thus, by utilising lightweight materials and relatively thin dimensions, it will be understood that the seat arrangement 1 can be of relatively low weight and therefore easy to deploy and stow. Typically, seat belts will be anchored directly to the vehicle body to ensure adequate strength during vehicle collisions.

The present seat arrangement 1 may be detachable from a vehicle by releasing the base hinge 6 attachment to the floor surface 8. Similarly, the seat

hinge 5 may be configurable to allow detachment and/or separation between the base member 2 and the back member 3 in order to facilitate movement between the stowed configuration (Figure 5) and the deployed configuration (Figure 1). Thus, the hinge 5 may be detachable i.e. straps which extend between the members 2,3 or be of a fixed nature to allow rotation thereabout.

With regard to the headrest 4, as indicated previously, it may be retractable into the back member 3. Thus, the headrest 4 itself may include a relatively hard resilient panel which combines with the back member 3 in order to constitute the resilient panel utilised to provide the load space floor surface or the headrest 4 may be retracted behind that resilient panel surface 14 of the back member 3.

It will be understood by those skilled in the art that the present seat arrangement could be provided within a vehicle in respect of both third (auxiliary) row and second (normal) row seating. Thus, when of a split configuration, a single seat in each row, one behind the other, can be provided with luggage space to one side of each such seat. Similarly, the second row seat arrangement could be stowed to provide a luggage space in front of the third row seat arrangement when deployed. In such circumstances, it will be appreciated the present arrangement allows a wide range of seat geometries within a vehicle.

By coupling the base hinge and/or the seat hinge with or about appropriate propulsion mechanisms, it will be understood that the present seat arrangement may be made to allow powered transfer between the stowed configuration (Figure 5) and the deployed seat configuration (Figure 1). Alternatively, such transfer may be through simple manual manipulation of the base member and back member about the base hinge and the seat hinge.

CLAIMS

1. A seat arrangement for a motor vehicle, the seat arrangement comprising a base member and a back member, the base member being hinged by a base hinge along an edge of a recess and to the back member by a seat hinge, the base member and the back member respectively having a resilient panel surface and the base member at least being rotatable about the base hinge to a configuration which is at least consistent with a part of the recess to form a robust bridge surface there across whilst the base member and the back member attached thereto can be rotated about the base hinge until the base member extends oppositely away from the edge of the recess and the back member extends upwardly from the base member to form a seat therebetween.

2. An arrangement as claimed in Claim 1, wherein the base member and the back member can be substantially aligned to substantially fill the recess in order to provide the robust bridge surface thereacross.

3. An arrangement as claimed in Claim 1 or Claim 2, wherein the robust bridge surface thereacross the recess is substantially planar with the edges of that recess to form a flat surface.

4. An arrangement as claimed in any preceding claim, wherein the base hinge allows the base member to subtend an arc of substantially 180° between a stowed configuration whereat there is the robust bridge surface thereacross the recess to a seat deployed configuration whereat there is the seat therebetween the back member and the base member.

5. An arrangement as claimed in any preceding claim, wherein the seat therebetween has the base member and the back member in a substantially perpendicular relationship.

6. An arrangement as claimed in any preceding claim, wherein the base member and/or the back member includes a cushion layer on the opposite side to the resilient panel surface.

7. A seat arrangement as claimed in Claim 6, wherein each cushioning layer supports and presents its respective base member and/or back member and so its resilient panel surface within the recess to facilitate the robust bridge surface thereacross the recess.

8. An arrangement as claimed in any preceding claim, wherein the arrangement includes valence members arranged about the recess and/or the base member and/or the back member in order to extend across any gaps between the recess and the base member and/or the back member to further facilitate consistency of the robust bridge surface thereacross the recess.

9. A seat arrangement as claimed in any preceding claim, wherein the back member includes a headrest and this headrest is displaceable to be retracted into the back member to facilitate entry by that back member into the recess.

10. A seat arrangement as claimed in any of Claims 1 to 8, wherein the arrangement includes a head rest and that head rest is displaceable upwardly to extend the length of the back member to provide a greater barrier between respective sides of the seat arrangement 1.

11. A seat arrangement substantially as hereinbefore described with reference to the accompanying drawings.

12. A motor vehicle including a seat arrangement as claimed in any preceding claim.

The Patent Office

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INVESTOR IN PEOPLE

Application No: GB 9826729.7 **Examiner:** Ceri Witchard
Claims searched: 1-12 **Date of search:** 8 April 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): A4L (LBRC LBRD LBPB LC4)

Int Cl (Ed.6): B60N (2/30 2/36)

Other: ONLINE: WPI JAPIO EDOC

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	US 4227736	(PEUGEOT) See column 1 lines 21-33 and figures 4 and 5	1-8
X	US 4932709	(LEAR SIEGLER) See third row of seats in figures 1 and 3	1, 3-6
X	US 5269581	(HONDA) See column 1 lines 24-41 and figures 1 and 3	1, 3-6
X	Derwent abstract AN 97-160810 & JP 090030303 See abstract and accompanying figure		1-7

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.